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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/016,017

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Sanjay Gopinath

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01/26/2005

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/016,017

Applicant(s)

GOPINATH ET AL.

Examiner

Laura M. Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 17-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 11-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

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DETAILED ACTION

Claim Objections

Claims 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuo et al ('089).

In reference to claim 1, Kuo teaches an apparatus for providing a solid precursor to a surface of a work piece via a supercritical solution, the apparatus comprising: a plurality of vessels (pressure pots, Col.17, lines: 1-20; and gear pump 126 (Col.17, lines: 25-30; and check valve Col.18, lines: 1-5 are all considered “vessels”) for housing the solid precursor (coating composition which contains solid fractions- Col. 13-14, lines: 50-50) and allowing it to contact a solvent (carbon dioxide) under supercritical or near supercritical conditions to generate a solution of the solid precursor (Col.18, lines: 5-20); wherein supercritical conditions exist when the temperature and pressure of a solution are

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above the solution's critical temperature and pressure, and wherein near supercritical conditions exist when the reduced temperature and pressure of a solution are both greater than 80% of their critical point but the solution is not yet in the supercritical phase (Col.4, lines: 45-65);

a generator recirculation loop in fluid communication with the plurality of vessels and allowing the solution of the solid precursor to recirculate through the plurality of vessels, said solution being under supercritical or near supercritical conditions over its entire recirculation path (Col.18, lines: 10-35); and a delivery mechanism adapted to deliver, under supercritical or near supercritical conditions, a portion of the solution to a reactor for housing said work piece Col.18, lines: 35-45);

wherein the solid precursor is a solid at or about standard temperature and pressure (Col.13, lines: 60-69- vinyl is a solid at standard temperature and pressure).

In reference to claim 2, Kuo teaches apparatus of claim 1, wherein the solution is a saturated solution (saturated is interpreted to mean thoroughly wet (see Webster-Merriam's Collegiate Dictionary, 10th Ed.) (Col.14, lines: 30-40).

In reference to claim 6, Kuo teaches the apparatus of claim 2, wherein the generator recirculation loop comprises a pump for providing fluid flow and a valve for causing at least some fraction of the solvent to circulate through the plurality of vessels housing the solid precursor to ensure production of the saturated solution ((Col.17, lines: 25-30-precision gear pump)).

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-5, 7-10,16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo et al ('089) as applied to claim 1 above, and further in view of DeYoung et al ('900).

In reference to claim 3, Kuo teaches the limitations of claim 1 and further teaches wherein the delivery mechanism comprises a plurality of piston pumps (Col.20, lines: 63-69) and in reference to claims 7 and 8, Kuo teaches a dilution mechanism which comprises a plurality of piston pumps for a supercritical solution(Col.16, lines: 45-60).

However, Kuo fails to explicitly teach the apparatus of claim 1, wherein the delivery mechanism comprises a plurality of syringe pumps as recited by claim 3.

In reference to claims 7, Kuo fails to explicitly teach wherein the dilution mechanism also comprises the plurality of syringe pumps.

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In reference to claim 8, Kuo fails to explicitly teach wherein the dilution mechanism supplying the plurality of syringe pumps.

However DeYoung ('900) teaches a similar method for depositing supercritical fluids and teaches that either piston pumps or syringe pumps are used in fluid transfer devices.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kuo's teachings to use a syringe pump rather than a piston pump as taught by DeYoung because as DeYoung teaches such devices are capable of accurately and consistently metering a flow of fluid (Col.15, lines: 10-15)

In reference to claim 4, Kuo teaches further comprising a dilution mechanism for diluting the saturated solution with said solvent under supercritical or near supercritical conditions to produce a diluted solution of the solid precursor for delivery to the reactor (Kuo-Abs., lines:1-8 and solid fractions- Col. 13-14, lines: 50-50).

In reference to claim 9, Kuo teaches further comprising a reactor recirculation loop configured to allow recirculation of the diluted solution through the reactor under supercritical or near supercritical conditions (Col.18, lines: 10-25-circulation loop).

In reference to claim 10, Kuo teaches further comprising a first fluid inlet, in fluid communication with the reactor, for supplying supercritical fluids to the reactor (Col.18, lines: 1-10-check valve); and

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a first bleed valve, located downstream from the reactor Col.18, lines: 33-35-pressure relief valve).

In reference to claim 5, Kuo teaches wherein the workpiece is a substrate (Col.Col.11, lines: 5-10); however fails to specify as claimed that the workpiece is a partially fabricated integrated circuit.

However, DeYoung teaches a very similar apparatus which implements a spray member to distribute a supercritical fluid onto partially fabricated ICs (Col.1, lines: 1-35).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kuo's teachings to further include distributing supercritical fluids onto partially fabricated ICs as taught by DeYoung because as DeYoung teaches a process fluid including supercritical carbon is effective in cleaning integrated circuits (Col.2, lines: 25-35)

In reference to claim 16, Kuo teaches the apparatus of claim 1, however fails to explicitly teach wherein components of the apparatus comprise at least one of hastalloy, stainless steel, and inconel.

However, DeYoung teaches wherein the components of the apparatus comprise stainless steel (Col.22, lines: 20-25).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kuo to fabricate part of the apparatus out of stainless steel as taught by DeYoung, because as DeYoung teaches, stainless steel is appropriate to use for a spray distribution apparatus (Col.22, lines: 20-25).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo et al (089) and DeYoung ('900) as applied to claim 9 above, and further in view of Vaartstra ('828).

In reference to claim 15, Kuo and DeYoung teach the apparatus of claim 9, however fails to explicitly teach wherein the reactor recirculation loop provides flow of the diluted solution through the reactor at between about 50 and 200ml per minute.

However, Vaartstra teaches a related method for supplying a supercritical fluid through a reactor recirculation loop at a flow of 10 mL/minute (Col.10, lines: 10-20).

Although the prior art range does not overlap with that claimed by the Applicant, These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205

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USPQ 215 (CCPA 1985) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter: In reference to claim 11, prior art of record fails to teach nor suggest further comprising a by-pass line configured to allow isolation of the reactor from the reactor recirculation loop, thus forming a by-pass recirculation loop in combination with the recited elements of dependent claim 10. Consequently, claim 11 is deemed to be allowable over prior art. Moreover, claims 12-14 depend either directly or indirectly from claim 11 and act only to further narrow the subject matter of claim 11 and are therefore also determined to contain allowable subject matter.

Response to Arguments

Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

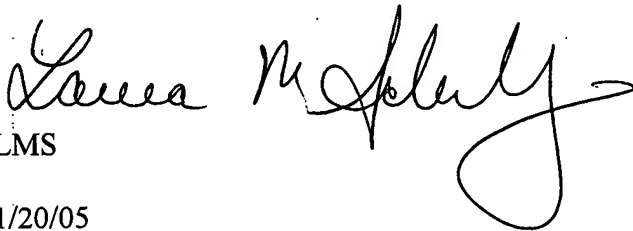
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "LMS", with a large, stylized loop at the end.

LMS

1/20/05